

Cavity Field Spectra of a Cascade Three-Level Atom Interacting with a Single-Mode Field with Kerr-Like Medium

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Abstract: The cavity field spectrum of a cascade three-level atom interacting with single-mode field with Kerr-like medium in the cavity is investigated. The numerical results for the initial field in pure number state, coherent state and squeezed vacuum state are calculated, respectively. It is found that the Kerr-like medium affects the spectral structure even though the initial field is in vacuum when the atom is in upper level. In the case of strong input field, the number state spectrum shows two peaks with different heights; and the superposition state spectrum shows a multi-peak structure with an equal distance of two neighboring peaks. The spectral "central frequency" shifts away from the resonant frequency with the increasing of average photon number.

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Key words: cavity field spectrum, Kerr-like medium, cascade three-level atom

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